

AMENDMENT

Kindly amend the application, without prejudice, without admission, without surrender of subject matter, and without any intention of creating any estoppel as to equivalents, as follows:

IN THE CLAIMS

Please add the following claims, without prejudice, without admission, without surrender of subject matter, and without any intention of creating any estoppel as to equivalents:

73. (New) An isolated first polypeptide which exhibits a substantial immunological reactivity with a polyclonal rabbit antibody raised against a second polypeptide having an apparent molecular weight of 13 kDa as determined by SDS PAGE followed by visualization and being derived from *Borrelia burgdorferi* B313, said second polypeptide comprising the amino acid sequence 1-167 of SEQ ID NO: 19, said polyclonal rabbit antibody exhibiting substantially no immunological reactivity with whole cell preparations from at least 95% of randomly selected *B. hermsii*, *B. crocidurae*, *B. anserina*, or *B. hispanica*, with the proviso that said first polypeptide is essentially free from other *Borrelia*-derived antigens when it is identical in amino acid sequence to a third polypeptide which is a 13 kDa surface exposed polypeptide extracted from *Borrelia burgdorferi sensu lato*; the first polypeptide optionally being lipidated.

74. (New) The isolated first polypeptide according to claim 73, which has an amino acid sequence contained in a fourth polypeptide; wherein said fourth polypeptide is present in whole cell preparations of *Borrelia burgdorferi* B31, *Borrelia burgdorferi* B313, *Borrelia garinii* IP90, or *Borrelia afzelii* ACA1 but is substantially absent from whole cell preparations of at least 95% of randomly selected *Borrelia hermsii*, *Borrelia crocidurae*, *Borrelia anserina*, or *Borrelia hispanica*.

75. (New) The isolated first polypeptide according claim 73, which comprises at least a portion of the amino acid sequence of a protein having an apparent molecular weight of 13 kDa; wherein said protein is present in whole cell preparations of *Borrelia burgdorferi* B31, *Borrelia burgdorferi* B313, *Borrelia garinii* IP90, or *Borrelia afzelii* ACA1 but is substantially absent from whole cell preparations of at least 95% of randomly selected *Borrelia hermsii*, *Borrelia crocidurae*, *Borrelia anserina*, and *Borrelia hispanica*.

76. (New) The isolated first polypeptide according to claim 73, which comprises at least one epitope; wherein said epitope is present in whole cell preparations of *Borrelia burgdorferi* B31, *Borrelia burgdorferi* B313, *Borrelia garinii* IP90, or *Borrelia afzelii* ACA1 but

is substantially absent from whole cell preparations of at least 95% of randomly selected *Borrelia hermsii*, *Borrelia crocidurae*, *Borrelia anserina*, and *Borrelia hispanica*.

77. (New) The isolated first polypeptide according to claim 73, which comprises at least one epitope of a protein having an apparent molecular weight of 13 kDa; wherein said protein is present in whole cell preparations of *Borrelia burgdorferi* B31, *Borrelia burgdorferi* B313, *Borrelia garinii* IP90, or *Borrelia afzelii* ACAI but is substantially absent from whole cell preparations of at least 95 % of randomly selected *Borrelia hermsii*, *Borrelia crocidurae*, *Borrelia anserina*, and *Borrelia hispanica*.

78. (New) The isolated first polypeptide according to claim 73, which comprises at least one amino acid sequence selected from the group consisting of: amino acid residues 19-27 in SEQ ID NO: 19, amino acid residues 33-36 in SEQ ID NO: 19, amino acid residues 41-47 in SEQ ID NO: 19, amino acid residues 95-104 in SEQ ID NO: 19, amino acid residues 138-147 in SEQ ID NO: 19, amino acid residues 174-179 in SEQ ID NO: 19, amino acid residues 19-26 in SEQ ID NO: 21, amino acid residues 32-35 in SEQ ID NO: 21, amino acid residues 40-47 in SEQ ID NO: 21, amino acid residues 94-101 in SEQ ID NO: 21, amino acid residues 137-146 in SEQ ID NO: 21, amino acid residues 174-178 in SEQ ID NO: 21, amino acid residues 18-26 SEQ ID NO: 23, amino acid residues 30-33 SEQ ID NO: 23, amino acid residues 39-46 SEQ ID NO: 23, amino acid residues 91-104 SEQ ID NO: 23, amino acid residues 137-145 SEQ ID NO: 23, and amino acid residues 173-177 in SEQ ID NO: 23.

79. (New) The isolated first polypeptide according to claim 73, which has an amino acid sequence identical to that of a protein having an apparent molecular weight of 13 kDa and being present in whole cell preparations of *Borrelia burgdorferi* B31, *Borrelia burgdorferi* B313, *Borrelia garinii* IP90, or *Borrelia afzelii* ACAI.

80. (New) The isolated first polypeptide according to claim 79, wherein the protein is present in fraction B from *Borrelia burgdorferi* B31, *Borrelia burgdorferi* B313, *Borrelia garinii* IP90, or *Borrelia afzelii* ACAI.

81. (New) The isolated first polypeptide according to claim 79, wherein the protein is the third polypeptide.

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1 82. (New) The isolated first polypeptide fragment according to claim 73, which has an amino acid sequence exhibiting a sequence identity of at least 50% with an amino acid sequence selected from SEQ ID NO: 19, SEQ ID NO: 21, SEQ ID NO: 23, a subsequence of SEQ ID NO: 19 containing of at least 10 contiguous amino acids of SEQ ID NO: 19, a

subsequence of SEQ ID NO: 21 containing of at least 10 contiguous amino acids of SEQ ID NO: 21, and a subsequence of SEQ ID NO: 23 containing of at least 10 contiguous amino acids of SEQ ID NO: 23.

83. (New) The isolated first polypeptide fragment according to claim 73, which is encoded by a nucleotide sequence exhibiting a sequence identity of at least 70% with a sequence selected from the group consisting of SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, a subsequence of SEQ ID NO: 18 containing at least 12 contiguous nucleotides of SEQ ID NO: 18, a subsequence of SEQ ID NO: 20 containing at least 12 contiguous nucleotides of SEQ ID NO: 20, and a subsequence of SEQ ID NO: 22 containing at least 12 contiguous nucleotides of SEQ ID NO: 22.

84. (New) The isolated first polypeptide according to claim 93, which comprises an amino acid sequence selected from the group consisting of SEQ ID NOs: 19, 21, and 23.

85. (New) The isolated first polypeptide according to claim 84, which is encoded by a nucleotide sequence selected from the group consisting of SEQ ID NOs: 18, 20, and 22.

~~86.~~ (New) A fusion polypeptide comprising a first fusion partner and a second fusion partner; wherein the first fusion partner is the isolated first polypeptide according to claim 73.

87. (New) The fusion polypeptide according to claim 86, wherein the second fusion partner enhances the immunogenicity of the fusion polypeptide relative to the immunogenicity of a polypeptide not comprising said second fusion partner; or the second fusion partner facilitates the expression of the fusion polypeptide in a host cell and/or subsequent purification of the fusion polypeptide.

88. (New) The fusion polypeptide according to claim 86, wherein the second fusion partner is at least one polypeptide selected from the group consisting of:

- a polypeptide selected from the group consisting of: amino acid residues 19-27 in SEQ ID NO: 19, amino acid residues 33-36 in SEQ ID NO: 19, amino acid residues 41-47 in SEQ ID NO: 19, amino acid residues 95-104 in SEQ ID NO: 19, amino acid residues 138-147 in SEQ ID NO: 19, amino acid residues 174-179 in SEQ ID NO: 19, amino acid residues 19-26 in SEQ ID NO: 21, amino acid residues 32-35 in SEQ ID NO: 21, amino acid residues 40-47 in SEQ ID NO: 21, amino acid residues 94-101 in SEQ ID NO: 21, amino acid residues 137-146 in SEQ ID NO: 21, amino acid residues 174-178 in SEQ ID NO: 21, amino acid residues 18-26 SEQ ID NO: 23, amino acid residues 30-33 SEQ ID NO: 23, amino acid residues 39-46 SEQ ID NO: 23, amino acid residues 91-104 SEQ ID

NO: 23, amino acid residues 137-145 SEQ ID NO: 23, and amino acid residues 173177 in SEQ ID NO: 23;

- a lipoprotein selected from the group consisting of an outer membrane lipoprotein from *E. coli* and an outer membrane lipoprotein from OspA from *Borrelia burgdorferi sensu lato*;
- a viral protein selected from the group consisting of Hepatitis B surface antigen, Hepatitis B core antigen, and the influenza virus non-structural protein NS1;
- an immunoglobulin binding protein selected from the group consisting of protein A, protein G, and the synthetic ZZ-peptide;
- a T-cell epitope;
- a B-cell epitope;
- a bacterial fimbrial protein selected from the group consisting of pilus components pilin and papA, and
- a polypeptide selected from the group consisting of the maltose binding protein, glutathione S-transferase, β -galactosidase, and polyhistidine.

89. (New) An immunological composition comprising the isolated first polypeptide according to claim 73, in an amount effective to elicit an immunogenic response in an animal or human to which the composition is administered, and a pharmaceutically acceptable carrier, diluent or vehicle; and optionally further comprising an adjuvant.

90. (New) The immunological composition according to claim 89, wherein the pharmaceutically acceptable carrier, diluent or vehicle is selected from the group consisting of sterile water, physiological saline, glucose, a polyalkylene glycol, and a triglyceride.

91. (New) The immunological composition according to claim 89 wherein the adjuvant is present and is selected from the group consisting of: aluminium hydroxide or phosphate (alum), a synthetic polymer of sugar, bacterial cells or components thereof, and a physiologically acceptable oil vehicle; wherein the bacterial cells or components thereof are *C. parvum* cells, or endotoxins or lipopolysaccharide components of gram-negative bacteria; and, the physiologically acceptable oil vehicle contains mannide mono-oleate or a perfluorocarbon.

92. (New) The immunological composition according to claim 90 wherein the adjuvant is present and is selected from the group consisting of: aluminium hydroxide or phosphate (alum), a synthetic polymer of sugar, bacterial cells or components thereof, and a physiologically acceptable oil vehicle; wherein the bacterial cells or components thereof are *C.*

parvum cells, or endotoxins or lipopolysaccharide components of gram-negative bacteria; and, the physiologically acceptable oil vehicle contains mannide mono-oleate or a perfluorocarbon.

93. (New) The immunological composition according to claim 89, wherein the amount of the isolated first polypeptide is in the range of 1-1000 μg per dose unit.

94. (New) The immunological composition according to claim 89, wherein the amount of the isolated first polypeptide is in the range of between 2 and 750 μg per unit dose.

95. (New) The immunological composition according to claim 89, wherein the amount of the isolated first polypeptide is in the range of between 5 and 500 μg per unit dose.

96. (New) The immunological composition according to claim 89, wherein the amount of the isolated first polypeptide is in the range of between 7.5 and 250 μg per unit dose.

97. (New) The immunological composition according to claim 89, wherein the amount of the isolated first polypeptide is in the range of between 10 and 150 μg per unit dose.

98. (New) The immunological composition according to claim 89, wherein the amount of the isolated first polypeptide is in the range of between 10 and 100 μg per unit dose.

99. (New) The immunological composition according to claim 89, wherein the amount of the isolated first polypeptide is in the range of between 10 and 75 μg per unit dose.

100. (New) The immunological composition according to claim 89, wherein the amount of the isolated first polypeptide is in the range of between 10 and 50 μg per unit dose.

101. (New) The immunological composition according to claim 89 further comprising at least one additional *Borrelia* antigen.

102. (New) The immunological composition of claim 101, wherein the at least one additional *Borrelia* antigen is selected from the group consisting of OspA, OspB, OspC, OspD, OspE, OspF, OspG, PC, Oms28, Oms45, Oms 66, decorin binding protein (dbp), LpLA7, EppA, T5, S1, 26 kDa antigen, 39 kDa antigen, 66 kDa antigen, 79 kDa antigen, 85 kDa antigen, and 110 kDa antigen.

103. (New) An immunological composition comprising two non-identical isolated first polypeptides according to claim 73, in an amount effective to elicit an immunogenic response in an animal or human to which the composition is administered, and a pharmaceutically acceptable carrier, diluent or vehicle; and optionally further comprising an adjuvant.

104 (New) A diagnostic composition for the detection of *Borrelia burgdorferi sensu lato* in a sample; said composition comprising the isolated first polypeptide according to claims 73 in an amount effective to detectably react with any antibodies present in the sample directed

against *Borrelia burgdorferi sensu lato*; and, the composition optionally further comprises a detectable label.

105. (New) A method for inducing an immunological response in an animal or a human, against *Borrelia burgdorferi sensu lato*; the method comprising administering to the animal an immunogenically effective amount of the immunological composition according to claim 89.

106. (New) A diagnostic kit comprising an isolated first polypeptide according to claim 73, and a means for detecting the isolated first polypeptide with antibody bound thereto.

~~107.~~ (New) A diagnostic kit comprising:

- an isolated nucleic acid fragment which encodes a polypeptide fragment which exhibits a substantial immunological reactivity with a rabbit polyclonal antibody raised against a polypeptide having an apparent molecular weight of 13kDa as determined by SDS-PAGE followed by visualization, said polypeptide being derived from *Borrelia burgdorferi* B313 and being encoded by the nucleotide sequence of SEQ ID NO: 18, said rabbit polyclonal antibody exhibiting substantially no immunological reactivity with proteins from at least 95% of spirochaetes randomly selected from the group consisting of *Borrelia hermsii*, *Borrelia crocidurae*, *Borrelia anserina* and *Borrelia hispanica*, and/or said isolated nucleic acid fragment hybridizes readily under highly stringent hybridization conditions with a DNA fragment having a nucleotide sequence selected from the group consisting of SEQ ID NO: 18, SEQ ID NO: 20, and SEQ ID NO: 22, or with a DNA fragment complementary thereto, but exhibits no substantial hybridization when the hybridization conditions are highly stringent with genomic DNA from at least 95% of spirochaetes randomly selected from the group consisting of *Borrelia hermsii*, *Borrelia crocidurae*, *Borrelia anserina* and *Borrelia hispanica*; and a means for detecting the binding between the nucleic acid fragment and a nucleic acid molecule bound thereto, or

- a set of nucleic acid primers which, when used in a molecular amplification procedure together with the nucleic acid fragment, will result in specific amplification of said nucleic acid fragment; and a means for detecting the amplified nucleic acid fragment.

108. (New) The immunological composition of claim 89 wherein the isolated first polypeptide is prepared by synthesizing the isolated first polypeptide by solid phase peptide synthesis or liquid phase peptide synthesis; or expressing, in a cell which does not natively express it, a nucleic acid fragment comprising a nucleotide sequence encoding the isolated first polypeptide.

109. (New) The immunological composition of claim 101 wherein the isolated first polypeptide is prepared by synthesizing the isolated first polypeptide by solid phase peptide synthesis or liquid phase peptide synthesis; or expressing, in a cell which does not natively express it, a nucleic acid fragment comprising a nucleotide sequence encoding the isolated first polypeptide.

110. (New) The immunological composition of claim 103 wherein the isolated first polypeptides are prepared by synthesizing the isolated first polypeptide by solid phase peptide synthesis or liquid phase peptide synthesis; or expressing, in a cell which does not natively express it, a nucleic acid fragment comprising a nucleotide sequence encoding the isolated first polypeptide.

111. (New) The diagnostic composition of claim 104 wherein the isolated first polypeptide is prepared by synthesizing the isolated first polypeptide by solid phase peptide synthesis or liquid phase peptide synthesis; or expressing, in a cell which does not natively express it, a nucleic acid fragment comprising a nucleotide sequence encoding the isolated first polypeptide.--

Kindly cancel, without prejudice, without admission, without surrender of subject matter, and without any intention of creating any estoppel as to equivalents, claims 1-72.